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FIVE NEW SPECIES OF *SIDA* L. (MALVACEAE) FROM AUSTRALIA

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Summary

Five new species of *Sida* L., *S. arenicola, S. argillacea, S. asterocalyx, S. brachypoda* and *S. everistiana* are described, with notes on their distribution and relationship to other species that occur in Australia.

The Australian species of *Sida* L. have been studied at the Queensland Herbarium over many years because there has always been some confusion in the identity of the species. The late Doctors, S.L. Everist and S.T. Blake, and Mr Les Pedley have collected specimens, made notes and constructed keys (unpublished) in an attempt to clarify the taxa. Studies undertaken by the authors over the past fifteen years have revealed the presence of undescribed taxa based around *S. corrugata* Lindley, *S. fibulifera* Lindley, *S. filiformis* Cunn. ex Hook., *S. trichopoda* F. Muell. and *S. calyxhymenia* Gay ex DC.–*S. petrophila* F. Muell. group. The acquisition of recent collections and further investigation by us have confirmed the specific status of some of these taxa.

Fryxell (1987) assigns eight of the Australian species of *Sida* L. to *Sida sens. str.* and the remainder to other genera. Most of the remaining species are said to pertain to *Sidastrum* E.G. Baker and a few that remained could not be placed either in *Sida* or *Sidastrum* e.g. *S. platycalyx* F. Muell. ex Benth.

The new species except *S. asterocalyx* are assignable to *Sidastrum*, although like most of the Australian species assignable to this genus, they differ from the American species (ex description, Baker 1892, Fryxell 1987) as follows: bracteoles or pseudo-involucre absent; flowers and stamens not reduced (some species, e.g. *S. corrugata* and forms of *S. trichopoda*, have large flowers with petals much longer than calyx); inflorescence axillary and not terminal, flowers in cymes or racemes or solitary, and not paniculate; mericarps strongly reticulate on the lateral sides; plants decumbent, procumbent or erect, instead of usually erect and shrubby.

S. asterocalyx on the other hand, although closely related to the new species, differs in having an enlarged calyx and belongs to a group of species with accrescent calyces which cannot be satisfactorily placed in the genera segregated from *Sida* L. (Fryxell 1978), e.g. *S. calyxhymenia*, *S. clementii* Domin and *S. physocalyx* F. Muell.

Because of the difficulty encountered in assigning some of the Australian species to genera allied to *Sida* and also because the species closely resemble each other despite variation in the morphology of the calyx and mericarp, leaves, habit and type of inflorescence, we hesitate to split the genus and have kept to the extended use of *Sida* until major revisionary work is undertaken in the Australian species.

This work is based on morphological study of herbarium specimens at Brisbane and Melbourne.

Sida brachypoda Holland & S. Reyn. **sp. nov.** *Sida corrugatae* Lindley affinis praecipue differt fructibus pubescentibus, foliis serrulatis, petiolatis et pedicellis quoque brevioribus. **Typus:** Queensland. MARANOA DISTRICT: Boatman Station, 23 March 1947, *S.L. Everist* 2836 (holo: BRI; iso: BRI).

Subshrubs with several spreading decumbent stems to 75 cm, sparsely or densely stellate hairy all over. Leaves ovate to oblong ovate, apex obtuse or truncate, margins including apex serrulate-crenulate, base cordate or subcordate, 0.9–3.3 cm × 0.6–2.5 cm, both surfaces hairy, denser below, yellowish green, paler below, nerves prominent below; petioles slender, 2–20 mm long; stipules subulate, to 3 mm long, persistent. Flowers axillary, solitary; pedicels 2–6 mm long, rarely to 13 mm (10–13 mm in fruit), articulate

above the middle. Calyx cyathiform, 4–5 mm long, lobes 1.5–2 mm × 1.5–3 mm, ovate, acute, pubescent outside, glabrous inside. Corolla larger than calyx, lobes obovate, emarginate, 3 mm × 2–2.5 mm, yellow. Staminal tube 1–2 mm long, filaments 0.3–0.7 mm long. Styles 2.0–2.5 mm long, connate at base. Fruits depressed globose, 4–7 mm diameter, densely hairy; mericarps 9–13, dorsally deeply reticulate, reticulation obscured by hairs, alveolate on sides. Seeds dark reddish brown. **Fig. 1.**

Selected specimens (all BRI): **Western Australia.** Sturt Creek, ?Feb 1856, *Mueller* (MEL & K). **Northern Territory.** Settlement Creek, Feb 1923, *Brass* 296; O.T. Station, May 1947, *Blake* 17724; Stuart Hwy, 12 km N of Dunmarra, May 1987, *Wright* s.n.; Daly Waters Access Rd, May 1987, *Wright* s.n. **Queensland.** NORTH KENNEDY DISTRICT: 40 m [64 km] South of Mt Garnet, Aug 1967, *Morain* 188. MITCHELL DISTRICT: 5 km E of Highlands Stn, S of Emmet on road to springs at gate, Sep 1986, *Ballingall* 2281; about 3 miles [4.8 km] E of Jericho, Oct 1940, *Smith & Everist* 972A; Jericho, Apr 1946, *Clemens*; 10 miles [16 km] NW of Longreach, May 1936, *Everist & White* 107. LEICHHARDT DISTRICT: New Bombandy station, Mar 1979, *Anderson* 826. DARLING DOWNS DISTRICT: 12 miles [19.2 km] west of Meandarra, Apr 1959, *Johnson* 740; Glenoie, near Hannaford, Mar 1939, *Everist* 1757; Hannaford, Feb 1938, *White* 11176; Glenmorgan, Oct 1969, *Smith* s.n.; Woodlands station, 5 miles [8 km] SW of Westmar, Dec 1958, *Pedley* 364. MARANOA DISTRICT: Boatman Station, Mar 1947, *Everist* 2836; South of Bollon, Apr 1949, *Everist* 3691. WARREGO DISTRICT: Charleville, Oct 1945, *Clemens* s.n.; ditto, Apr 1946, *Blake* 11057; 8 km SW of Wallal Railway Siding, May 1982, *Neldner* 572 & *Thomas*; 5 km W of "Lowood" homestead, Jun 1976, *Purdie* 385D; 6 km S of Merrigang homestead, Jun 1976, *Purdie* 367D; Mooro, Cunnamulla, Mar 1961, *Gibb* s.n.; 7 km W of Charleville on Quilpie road, Apr 1984, *Ballingal* 1355.

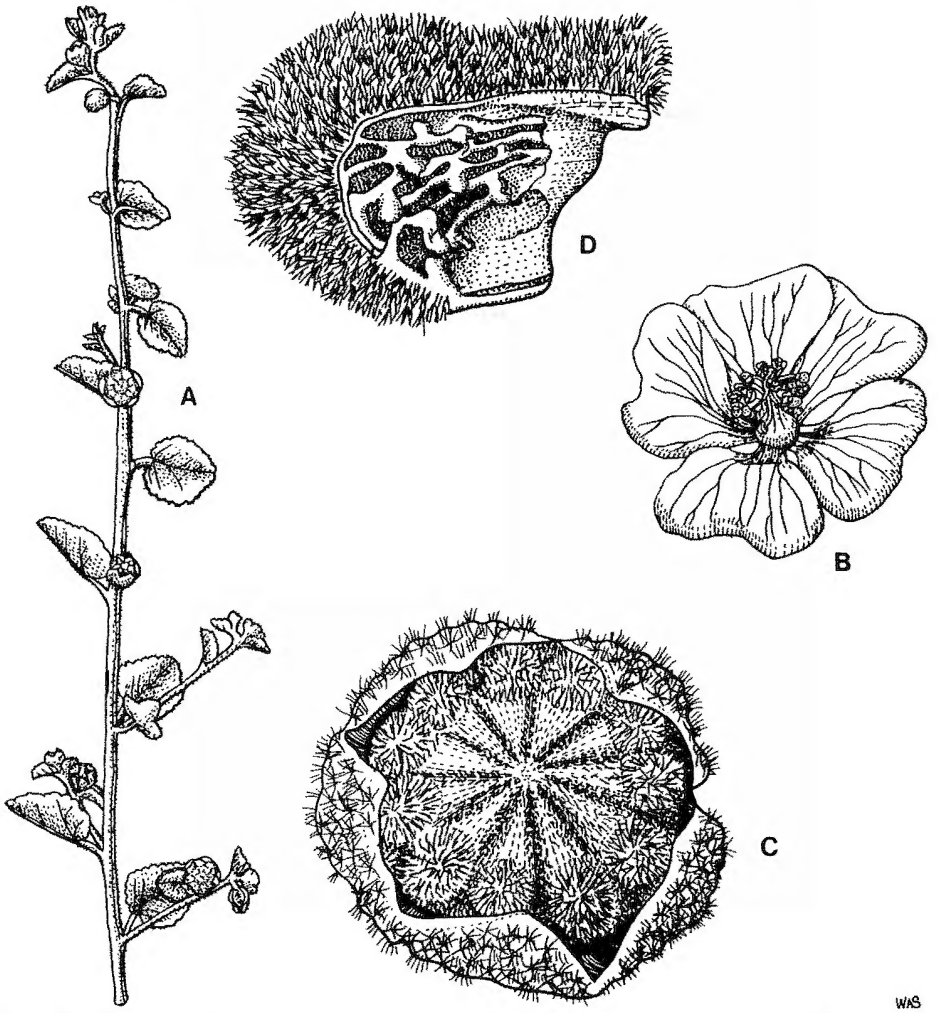

Fig. 1. *Sida brachypoda*: A. habit with fruit × 0.75. B. flower × 3. C. fruit × 6. D. Mericarp × 15. A,C,D Ballingall 2281; B Adams 1032.

Distribution and Habitat: Queensland, from south of Mt Garnet to Cunnamulla and from Meandarra to Longreach. Also in Western Australia and Northern Territory. Usually on red sandy loam in open *Eucalyptus* and *Acacia aneura* forests.

Affinities: This new species is related to *S. corrugata* Lindley differing especially in the densely hairy fruits, serrulate ovate leaves, and also shorter pedicels and petioles. For its differences from *Sida corrugata* and also *Sida everistiana* see the key under *S. everistiana.*

Note: The name *Sida brachypoda* is now validated. This name, although unpublished, has often been applied to collections of this species since F. Mueller named a collection from Sturt Creek with this epithet.

Sida everistiana S. Reyn. & Holland **sp. nov.** *Sida corrugatae* Lindley affinis a qua imprimis differt fructibus minoribus et mericarpium paucissimis (5) et minus corrugatis; petiolis et pedicellis brevioribus, calycis lobis acuminatis. **Typus:** Queensland. WARREGO DISTRICT: Victoria Downs, 5 miles [8 km] NW of Morven, 25 May 1949, *S.L. Everist* 3752 (holo: BRI; iso: BRI).

Low, twiggy subshrubs with tufted, procumbent stems 10–40 cm long, densely white stellate hairy all over. Leaves broadly ovate or rotund-ovate, apex obtuse, margins crenate-dentate, base truncate or rounded or broadly cuneate, rarely subcordate, 0.7–1.8 cm × 0.7–1.8 cm, both surfaces stellate hairy, denser below, dull greenish yellow, 3–5-nerved from base, nerves prominent below; petioles slender, 3–6 mm long; stipules subulate, 3–7 mm long, persistent. Flowers axillary, solitary; pedicels 0.5–2.5 mm long (4 mm in fruit), articulate in the middle. Calyx cyathiform to 5 mm long, lobes triangular, acuminate, 2–3 mm × 1.5–3 mm, pubescent outside, glabrous or finely hairy inside, purplish. Corolla lobes obovate, emarginate, 2–3 mm × 1.5–2 mm, yellow. Staminal tube 1.5–2 mm long, filaments 0.3–0.5 mm long. Styles 2–2.5 mm long, connate at base. Fruits ovoid with an apical rostrum, 3–4 mm diameter; mericarps 5, slightly rugose on back, alveolate on sides, finely hairy. Seeds reddish brown, glabrous. **Fig. 2.**

Selected specimens (all BRI): **Northern Territory.** Stony bank beside Stuart Hwy, 9 km N of Banka Banka, May 1987, *Wright* s.n. **Queensland.** BURKE DISTRICT: Hughenden, top of Mt Walker, Apr 1935, *Blake* 8439. GREGORY NORTH DISTRICT: Between Springvale and Boulia–Winton Rd., Jan 1937, *Everist & Smith* 113. MARANOA DISTRICT: Paradise Downs, 15 miles [24 km] NE of Blackall, Jul 1940, *Everist* 2152; Base of jump-up approx 9 km ESE of Kentle Downs, Jun 1977, *McDonald* 2532. WARREGO DISTRICT: Victoria Downs, 5 miles [8 km] NW of Morven, May 1949, *Everist* 3752; Tatala, 100 miles [160 km] S of Morven, Apr 1948, *Everist* 3424; 15 km E of Charleville along old Morven Road, near Leslie Station, Jun 1976, *Purdie* 342D; 15 km W of Cunnamulla on Bulloo Dev. Rd., Apr 1987, *Wright* s.n.

Distribution and Habitat: Western Queensland, from Hughenden to south of Bollon, usually on rocky hillsides on sandy clay-loam or stony soils in open woodlands. Also in Northern Territory.

Affinities: This new species is related to *S. corrugata* Lindley but differs particularly in the smaller, less corrugate fruits, fewer mericarps (5), shorter pedicels and petioles and acuminate calyx lobes. It can be distinguished from *S. corrugata* and *S. brachypoda* as follows:

1. Leaves truncate, rounded or cuneate at base; calyx lobes acuminate; fruits 3–4 mm diameter; mericarps 5 . . . . . **S. everistiana**
   Leaves cordate at base; calyx lobes acute; fruits 4–10 mm diameter; mericarps 6–13 2

2. Leaves orbicular or broadly ovate, margins coarsely crenate; pedicels 10–35 mm long, rarely less; petals 5–6 mm long; fruits glabrous or puberulent; mericarps strongly corrugate-reticulate; petioles 1.2–3.2 cm long . . **S. corrugata**
   Leaves ovate to oblong-ovate, margins serrulate-crenate; pedicels 2–6 mm long; petals 3 mm long; fruits densely hairy; mericarps not strongly corrugate; petioles 2–20 mm long . . . . . **S. brachypoda**

Etymology: This species is named in honour of Dr S.L. Everist (1913–1981), the collector of the type. He was very interested in the genus and collected extensively.

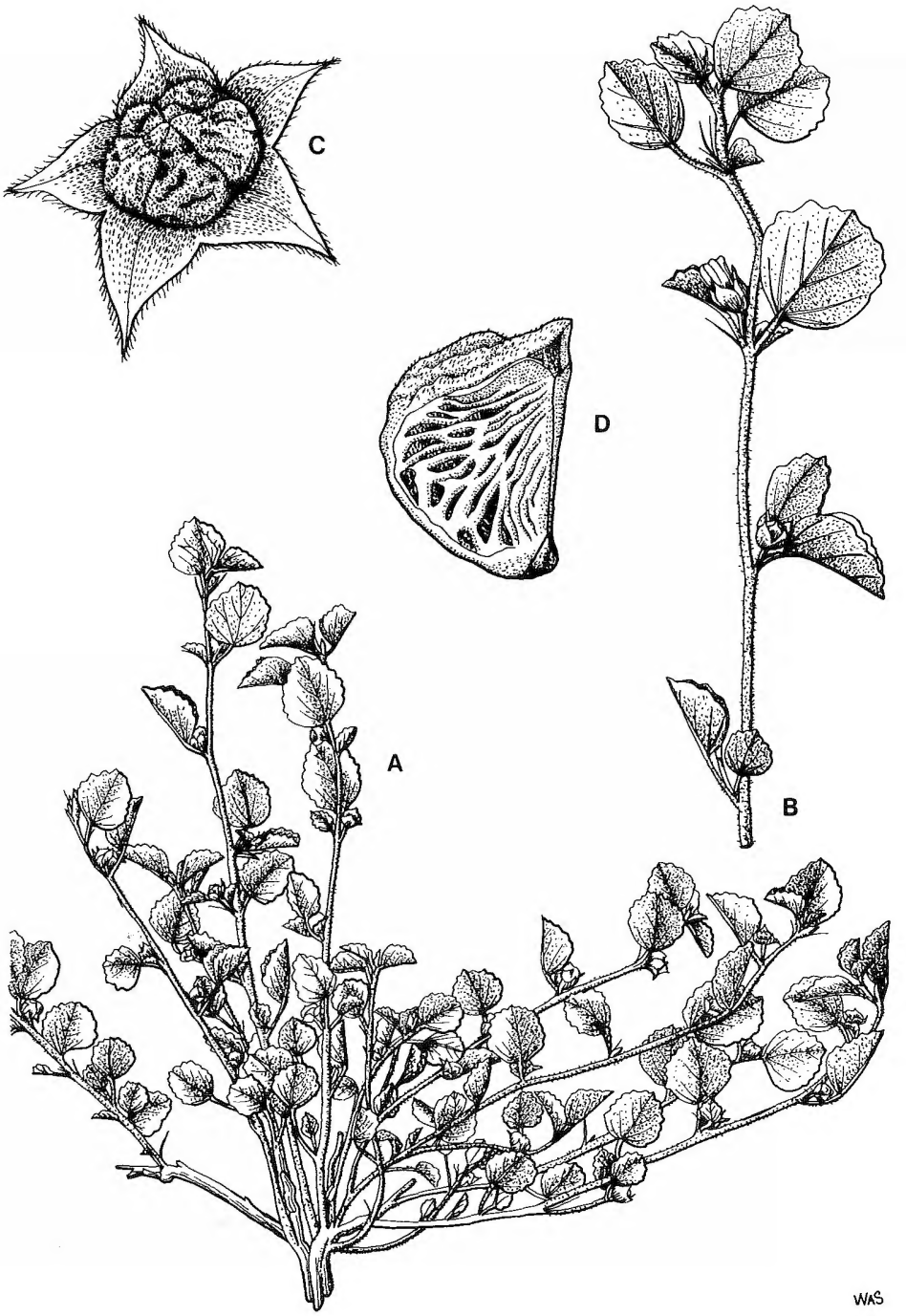

Fig. 2. *Sida everistiana*: A. habit × 0.75. B. Branch with flower and fruit × 1.5. C. fruit showing calyx × 6. D. Mericarp × 15. All from Blake 10625.

Sida asterocalyx S. Reyn. & Holland **sp. nov.** ex affinitate *Sida calyxhymeniae* Gay ex DC. et specierum affinum calycibus subfructibus omnibus stellatim patentibus purpureus conspicuis distinguenda. **Typus:** Queensland. WARREGO DISTRICT: Nerrigundah station, *ca* 60 km SW of Quilpie, 27 August 1975, *L. Pedley* 4222 (holo: BRI).

Erect shrubs to 2 m, densely velvety stellate hairy all over. Leaves ovate, obtuse or acute, crenulate-serrulate, base rounded, rarely subcordate, 4–35 mm × 3–20 mm, both surfaces velvety hairy, or coarser below, pale green or yellowish, paler below, 3- or 5-nerved from base, lateral nerves prominent below; petioles 3–8 mm long; stipules terete, 1–6 mm long, caducous. Flowers axillary, solitary; pedicels 8–20 mm long, articulate above the middle. Calyx (oblong, obtuse or truncate in bud), broadly cupular, lobed to about middle, 6–13 mm long, purplish, accrescent in fruit, becoming reticulate, membranous, lobes broadly obovate, obtuse, 3–5 mm × 6–9 mm, indistinctly 3-ribbed, sparsely stellate hairy outside, glabrous inside. Corolla lobes longer than calyx, obovate, truncate or emarginate, ciliate at base, 7–13 mm × 5–13 mm, bright yellow. Staminal tube patent hairy, either the tube 3–3.5 mm long with filaments 3–5 mm long and styles 1–4 mm long, or staminal tube 1–3 mm long with filaments 0.5–3 mm long and styles 4–8 mm long. Styles connate at base. Fruits depressed globose or broadly ovoid, 6–8 mm diameter, deeply grooved between mericarps, mericarps 5–8, slightly rugose on back and sides, densely hairy; fruiting calyx spreading, stellate, 20–25 mm diameter, purplish brown. Seeds reddish brown, pilose. **Fig. 3.**

Selected specimens (all BRI): **Western Australia.** *Edjudina Stn, about 130 km NNE of Kalgoorlie, *Wilson* 7551 (MEL). **Queensland.** WARREGO DISTRICT: 4 km NE of Toompine along main road to Quilpie, Sep 1984, *Purdie* 2148; Nerrigundah Station, *ca* 60 km SW of Quilpie, Aug 1975, *Pedley* 4222; *Ambathala Range Area, 50 km E of Adavale, Oct 1981, *Sandercoe* 508; *14.5 km SSE of Woolbuna, *ca* 2 km N along Woolbuna eastern boundary fence from old Quilpie Rd., Sep 1984, *Purdie* 2129. GREGORY SOUTH DISTRICT: Jump-up Grey Range, 62 km W of Quilpie, Aug 1986, *Ballingall* 2220; Mt Howitt Station, *ca* 70 miles [112 km] W of Eromanga, Jul 1936, *Blake* 11915.

Distribution and Habitat: South-western Queensland from Grey Range between Quilpie and Toompine to as far west as Mt Howitt Stn near the South Australian border. Also in Western Australia and probably South Australia and Northern Territory. Usually on hillsides on stony soils in low woodland.

Affinities: *Sida asterocalyx* can be distinguished from the alliance of *S. calyxhymenia* Gay ex DC. and related species, by its conspicuously enlarged patent calyx, lobed to above the middle, and its fruits with 5–8 clearly separated mericarps. For the differences between *S. asterocalyx* and related species see key under *S. arenicola.* This is a very variable species, especially in the leaves, with specimens marked * having much smaller leaves. It is also unusual in that specimens have two different types of flowers; one has long filaments and styles shorter than the staminal tube and the other has short filaments and long emergent styles. *Ballingal* 2220 and *Purdie* 2148 have both types of flowers present.

Etymology: This species derives its name from its enlarged, star-shaped, fruiting calyx.

Sida arenicola S. Reyn. & Holland **sp. nov.** *S. petrophilae* F. Muell. primo adspectu maxime simile, praecipue differt fructibus quinquecarpus foliorum forma et colorem indumentum calycibus et pedicellis ferrugino-brunneus. **Typus:** Northern Territory: 11 km from Rabbit Flat towards Mongrel Downs, July 1972, *C.H. Gittins* 2426 (holo: BRI).

Open, erect, several stemmed, subglabrous shrubs to 2 m, densely velvety hairy all over, pale green tinged red. Leaves narrowly ovate, sometimes obscurely 3-lobed, obtuse, serrulate, base truncate or rounded, 1.5–4.0 cm × 0.4–1.1(–1.4) cm, both surfaces densely velvety hairy, darker above, 3–7-nerved from base, lateral nerves prominent below; petioles 3–8 mm long; stipules 2–3.5 mm long, subulate, caducous. Flowers axillary, solitary or in pairs; pedicels 9–15 mm long (to 20 mm in fruit), articulate and dilated above middle. Calyx (ovate and 5-angular in bud), deeply lobed, accrescent in fruit, 7–9 mm × 13 mm, lobes narrowly ovate, acuminate ± apiculate, (4–)5–7 mm × 3–4 mm, velvety hairy outside, puberulent or glabrous and reticulate inside. Corolla usually half as long as calyx, lobes obovate, ciliate at base, yellow. Staminal tube 2–2.5 mm long, filaments 0.5–1 mm long. Styles 4–5 mm long, connate at base. Fruits ovoid with an

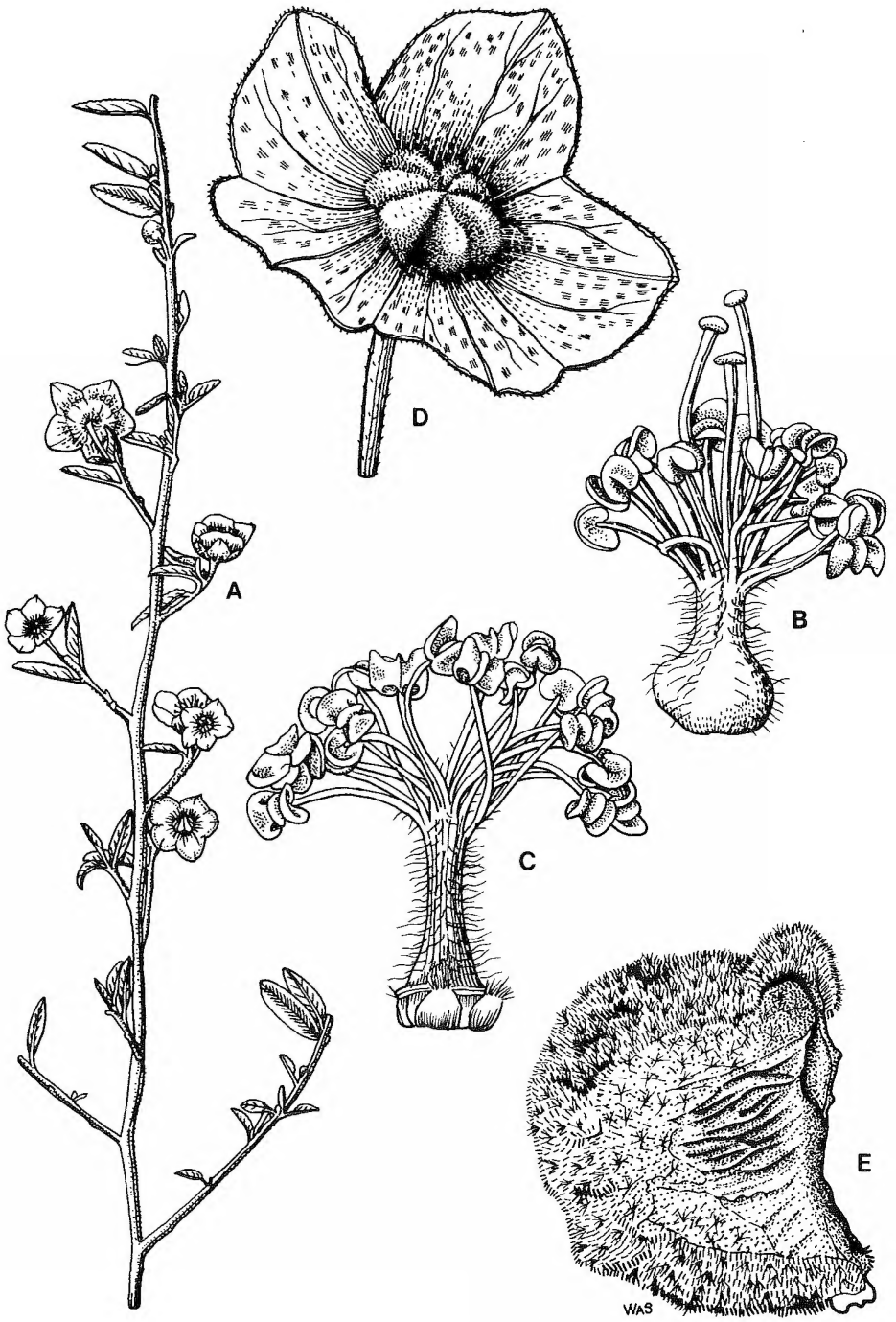

Fig. 3. *Sida asterocalyx*: A. habit with flowers and fruit × 0.75. B. Flower, with corolla and calyx removed, showing elongated styles and short filaments × 6. C. flower, with corolla and calyx removed, showing elongated filaments with styles enclosed in staminal tube × 6. D. fruit showing enlarged calyx × 3. E. Mericarp × 15. A,D,E Pedley 4222; B,C Ballingall 2220.

apical rostrum, 3–4 mm diameter, subtended by enlarged fruiting calyx 15–17 mm diameter, lobes patent, mericarps 5 or 6, slightly rugose on back, reticulate or alveolate on sides, glabrous. Seeds dark reddish brown. **Fig. 4.**

Selected specimens (all BRI): **Western Australia.** 180 km ENE Port Hedland, 10 km from coast, Sep 1976, *Story* 8199; 42 miles [67 km] WNW of Fitzroy Crossing township, Kimberleys, Sep 1959, *Lazarides* 6500 (MEL). **Northern Territory.** Tennant Creek, Jul 1946, *Blake* 16010; 6 miles [9.6 km] W of Frewena, Oct 1955, *Chippendale* 1526; 11 km from Rabbit Flat towards Mongrel Downs, Jul 1972, *Gittins* 2426; 193 km from Hooker Creek towards Tanami, Aug 1971, *Gittins* 2364; 13.6 km WSW of Soudan, Oct 1965, *Chippendale* 7289; 25 miles [40 km] WNW of Frewena, Jun 1960, *Chippendale* 7347; Rockhampton Downs Station, May 1947, *Blake* 17878.

Distribution and Habitat: Northern Territory and Western Australia from Tennant Ck to north of Alice Springs and in the Kimberley district in W.A., on sand in mixed open low scrubs.

Affinities: The new species is at first sight similar to *S. petrophila* F. Muell. but differs especially in the 5-celled fruits, leaf shape and indumentum of calyces and pedicels. It is also allied to *S. calyxhymenia* Gay ex DC. of which it has the glabrous fruits, but differs in the more narrow acuminate calyx lobes. *S. calyxhymenia* has a dark grey enlarged membranous calyx with broad acute calyx lobes. *S. arenicola* can be distinguished from closely related species as follows:

1. Fruits with clearly separated mericarps, 6–8 mm diameter; mericarps 5–8; calyx lobed to above the middle . . . . . **S. asterocalyx**
   Fruit not as above, 3–6 mm diameter; mericarps 5 or 6; calyx lobed to near base 2

2. Buds and calyces rusty-brown velvety hairy; calyx lobes acuminate . . **S. arenicola**
   Buds and calyces dark grey hairy; calyx lobes acute 3

3. Fruits hairy, mericarps 6; calyx lobes narrowly ovate, 2–3 mm wide, not membranous . . . . . **S. petrophila**
   Fruits glabrous, mericarps 5 or 6; calyx lobes broadly ovate, 5–7 mm wide, membranous . . . . . **S. calyxhymenia**

Etymology: This species is named after the habitat in which it is often found, that is in sand and sandy soils.

Sida argillacea Holland & S. Reyn. **sp. nov.** *Sida fibuliferae* Lindley affinis a qua imprimus differt ramulus floriferus brevioribus vel abscentia, fructibus majoribus pubescentibus, apicibus brevirostris, corollae persistentibus. **Typus:** Queensland. WARREGO DISTRICT: Wittenburra Station, 36 miles [57.6 km] S of Eulo, January 1937, *S.L. Everist & L.S. Smith* 18 (holo: BRI).

Low, twiggy tufted subshrubs with several stems to 35 cm, stellate hairy all over, yellow green. Leaves ovate or oblong, rarely obovate, obtuse or truncate, margins dentate or serrate, base rounded or truncate, rarely subcordate, 8–30 mm × 5–20 mm, upper surface sparsely stellate hairy, lower ones densely hairy, paler below, 3–5-nerved from base, nerves prominent below; petioles 6–24 mm long; stipules filiform, setaceous, 2–9 mm long, persistent. Flowers clustered in axils in short reduced racemes; pedicels 1–6 mm long, articulate above the middle; calyx broadly cupuliform, to 6 mm long, lobes triangular, acute, 1.5–3 mm × 1.5–3 mm, pubescent outside, glabrous inside; corolla lobes obovate, truncate, 2–3 mm × 1.5–2 mm, yellow; staminal tube 1–2 mm long, filaments to 0.5 mm long; styles 2–2.5 mm long, connate at base. Fruits broadly ovoid, smooth with an apical rostrum, 4–6 mm diameter, slightly grooved between mericarps, mericarps 5–7, densely stellate hairy. Seeds reddish brown, with a few fine hairs. **Fig. 5.**

Selected specimens (all BRI): **Northern Territory.** Buchanan Ck, 11.7 miles [16.7 km] SE of Alexandria, Jun 1960, *Chippendale* 7185; 7.7 miles [12.3 km] S Monkaderry W.H., Banka Banka, N.T., Jun 1960, *Chippendale* 7035; 10 miles [16 km] N of Brunchilly, Jun 1960, *Chippendale* 7061. **Queensland.** GREGORY NORTH DISTRICT: Currawilla, about 100 miles [160 km] west of Windorah, Jun 1949, *Everist* 3927. MARANOA DISTRICT: About 25 miles [40 km] NW of Bollon, Apr 1949, *Everist* 3699. WARREGO DISTRICT: Wittenburra Station, 36 miles [57.6 km] S of Eulo, Jan 1937, *Everist & Smith* 18; Curragh Station, near Cunnamulla, Jan 1931, *Hubbard* 6237. GREGORY SOUTH DISTRICT: Nockatunga Station, between channels of Wilson River, Jun 1936, *Blake* 11823.

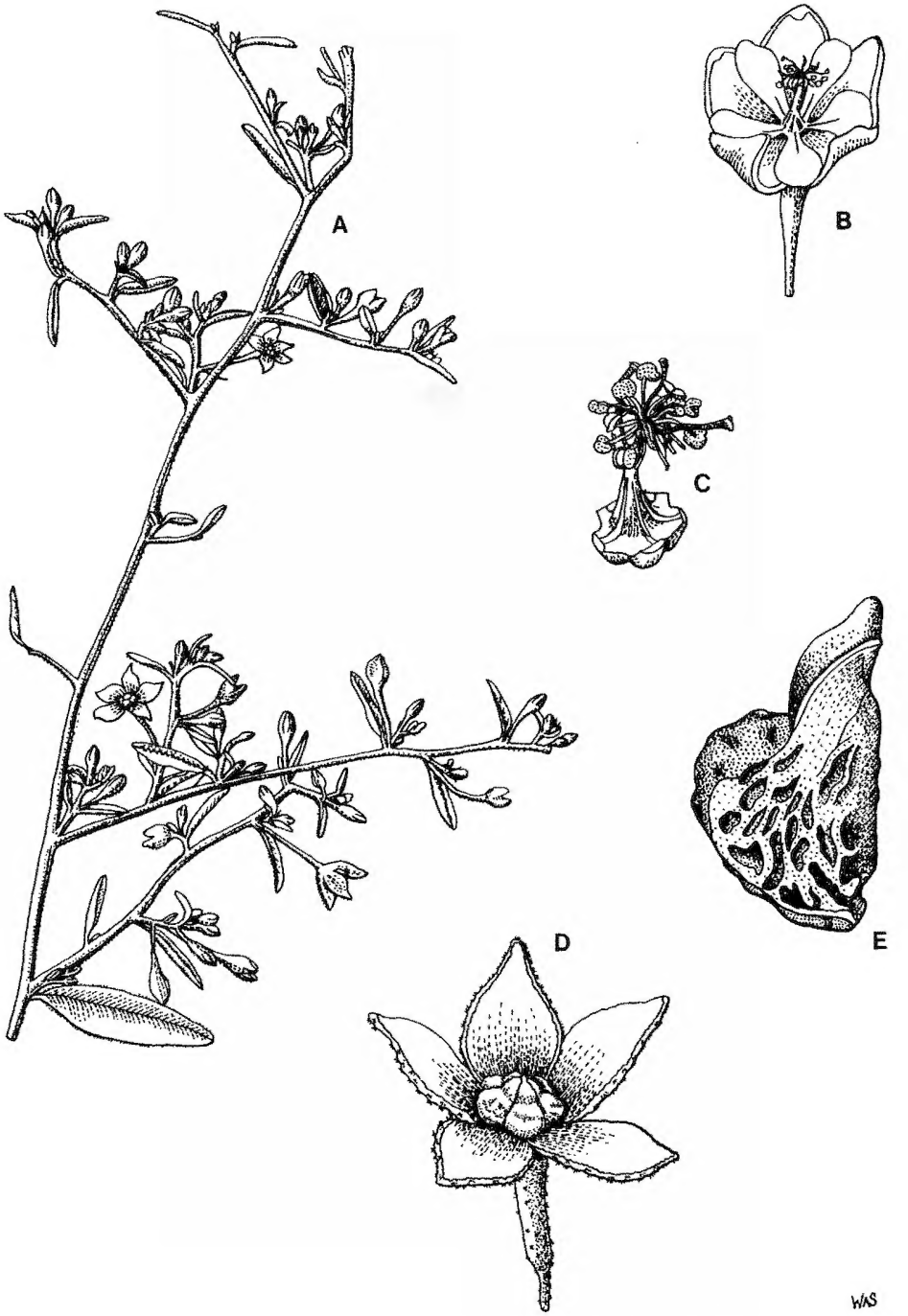

Fig. 4. *Sida arenicola*: A. habit with flowers and fruit × 0.75. B. flower × 3. C. flower with corolla and calyx removed × 6. D. fruit showing enlarged calyx × 3. E. mericarp × 15. A Gittins 2426; B,C,E Chippendale 1526; D Story 8199.

Distribution and Habitat: South-western Queensland and Northern Territory; from Bollon to Nockatunga Station in Queensland and from Alexandria to Banka Banka in the Northern Territory.

Affinities: This species is very close to *Sida fibulifera* Lindley, differing particularly in the larger, more densely hairy fruits and in the short reduced racemes clustered in the axils. The fruits have a distinct short apical rostrum often with the corolla persisting until maturity.

1. Flowers and fruits clustered in axils or in reduced racemes; pedicels 1–6 mm long; fruits densely hairy with an apical rostrum ..... **S. argillacea**
   Flowers and fruits in an elongated raceme to 50 mm long; pedicels to 20 mm long; fruits glabrous or puberulent, usually without an apical rostrum ..... **S. fibulifera**

Etymology: This species is named after the habitat in which it usually grows, that is, in clay soils, and probably matches *Sida* sp. C. of A.S. Mitchell (1981).

Acknowledgements

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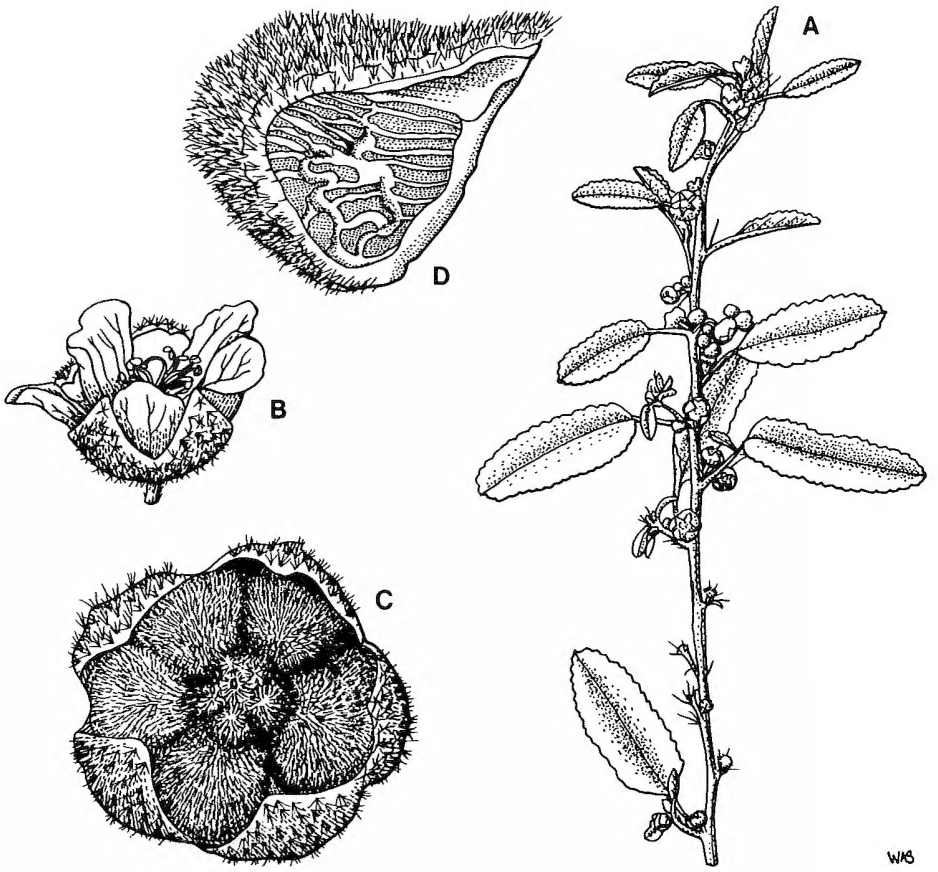

Fig. 5. *Sida argillacea*: A. habit showing flower clusters × 0.75. B. flower × 3. C. fruit × 6. D. mericarp × 15. A Everist 3927; B Blake 11823; C,D Everist 3199.